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MS APPEAL BRIEF - PATENTS
PATENT
1928-0121P

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of		Before the Board of Appeals	
Ka-Lun LEE		Appeal No.:	
Appl. No.:	09/931,041	Group:	2834
Filed:	August 17, 2001	Examiner:	D. LE
Conf.:	2678		
For:	ELECTRIC MOTOR		

APPEAL BRIEF TRANSMITTAL FORM

MS APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 4, 2003

Sir:

Transmitted herewith is an Appeal Brief (in triplicate) on behalf of the Appellants in connection with the above-identified application.

☐ The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

A Notice of Appeal was filed on June 4, 2003.

☐ Applicant claims small entity status in accordance with 37 C.F.R. § 1.27

The fee has been calculated as shown below:

☐ Extension of time fee pursuant to 37 C.F.R. §§ 1.17 and 1.136(a) -

☒ Fee for filing an Appeal Brief - $320.00 (large entity).

☒ Check(s) in the amount of $320.00 is(are) attached.

☐ Please charge Deposit Account No. 02-2448 in the amount of $0.00. A triplicate copy of this sheet is attached.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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1928-0121P

Attachment(s)

(Rev. 04/29/03)

MS APPEAL BRIEF - PATENTS
PATENT
1928-121P

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BRIEF ON BEHALF OF APPELLANT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

August 4, 2003

Sir:

This Appeal Brief is respectfully submitted on behalf of the Appellant in connection with the above-identified application.

This is an Appeal from the Final Rejection of Claims 1-14 in the above-identified application, which claims were finally rejected in the Office Action dated February 11, 2003. The appealed claims 1-14 are set forth in the attached Appendix.

The required Appeal Brief Fee of $320.00 for filing a Brief in support of an appeal under 37 C.F.R. § 1.17(f) is submitted herewith.

I. REAL PARTY IN INTEREST

In accordance with 37 C.F.R. § 1.192(c)(1), it is submitted that the real party in interest of the present application is the Assignee, Johnson Electric S.A. as recorded on August 17, 2001 at Reel 012114, Frames 0140-0142. No further assignments of this application have been made.

II. RELATED APPEALS AND INTERFERENCES

In accordance with 37 C.F.R. § 1.192(c)(2), it is submitted that there are no related appeals or interferences known to Appellant, the undersigned, or the Assignees that will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

III. STATUS OF THE CLAIMS

Claims 1-14 are pending in this application. Claims 1-14 have been rejected under 35 U.S.C. § 103 under grounds of obviousness. This rejection is now appealed. All of the claims 1-14 are to be considered in the appeal.

IV. STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed on April 23, 2003. An Advisory Action dated May 9, 2003 indicated that the Amendment would not be entered because it raises new issues. After discussion, the Examiner, in a Supplemental Advisory Action dated May 23, 2003, took a position which indicated that the

Amendment will be entered for purposes of appeal and that claims 1 to 14 are rejected. However, the Examiner indicated in Box 5 that the application was not in condition for allowance because "Lau shows the coil extending axially." Since the Lau reference was not originally applied against the independent claim, but only against claim 3, and since the Amendment which was entered for purposes of appeal added a limitation from claim 3 to claim 1, it is assumed that the Examiner now means to include the **Lau** reference in the rejection of claim 1. A paper was filed on June 4, 2003, explaining Applicant's understanding of the rejection in view of the Supplemental Advisory Action. The Examiner has responded to this paper in a paper dated July 31, 2003, simply indicating that the Remarks were considered. It is assumed that Applicant's understanding that the **Lau** reference has now been added to the rejection of claim 1 is correct.

V. SUMMARY OF THE INVENTION

The present invention relates to an electric motor incorporating a speed sensor. As seen in Figure 1, the motor has a permanent magnet stator having two arcuate ceramic magnets (14), a rotor (16), a rotor shaft (24), armature core (26) and commutator (28). The shaft rides in bearings (18) at either end. Brushes (32) make a sliding contact with the commutator to connect the armature windings to a source of power. In addition, spring contacts (36) are mounted in the end cap (20). A coil (12) in the form of a single turn is mounted on one of the magnets using a thin material such as a conductive film,

conductive foil, conductive tape, conductive wire or printing on the surface of the magnet. The ends of the coil extend onto the end surface of the magnet to form the terminal pads (38) which form an electrical connection with spring contacts (36). The coil senses the change in magnetic flux as the rotor rotates to produce a series of pulse signals. By measuring the frequency of the pulses, the speed of the motor can be determined. The coil can take a number of different shapes as shown in Figures 2 through 5.

VI. ISSUES

Whether the Examiner was correct in rejecting claims 1, 2, 3, 11 and 14 as being obvious over Mohr in view of Wizenez et al. and Lau.

Also, whether the Examiner was correct in rejecting claims 4 to 10 as being obvious to Mohr, Wizenez et al., Lau and Jones et al.

Also, whether the Examiner was correct in rejecting claims 12 and 13 as being obvious over Mohr, Wizenez et al., Lau and Tajima et al.

VII. GROUPING OF CLAIMS

Group I includes independent claim 1 and dependent claims 2, 4, 5 and 14.

Group II includes claim 3.

Group III includes claim 6.

Group IV includes claim 7.

Group V includes claim 8.

Group VI includes claim 9.

Group VII includes claim 10.

Group VIII includes claims 11 to 13.

VIII. APPELLANTS' ARGUMENTS

First, Appellant again wishes to point out that his understanding of the rejection in view of the Supplemental Advisory Action is discussed in the Reply of June 4, 2003. Thus, it is assumed that the **Lau** reference is now part of each rejection so that claims 1, 2, 3, 11 and 14 are rejected over a three-way combination including Mohr, Wizenez et al. and Lau. It is further assumed that claims 4 to 10 are rejected over a four-way combination over these three references and Jones. Likewise, claims 12 and 13 are rejected over a four-way combination including these three references and Tajima et al.

The present application includes a single independent claim, namely, claim 1. This claim describes a permanent magnet direct current motor having a combination of elements including a permanent magnet stator, a rotor, a rotor shaft, armature core, plurality of poles and a commutator, and a speed sensor which is an axially extending coil of conductive material fixed to the surface of the magnet and located in the air gap between the magnet and the armature core.

The Examiner cited the **Mohr** reference to show a permanent magnet stator including at least one permanent magnet, a rotor including a rotor shaft, an armature core, an armature winding and a commutator, and a speed sensor, where the speed sensor is a coil. The Examiner admits that the reference does not show the speed sensor being fixed to the surface of the magnet and located in the air gap.

The **Wizenez et al.** reference was cited to show a speed sensor (3) fixed to the surface of the pole shoe and located in the air gap. The Examiner states that it would be obvious to combine these two teachings because they are from the same field of endeavor, and the purpose disclosed by one inventor would have been recognized in the pertinent art of others.

The Examiner cited the **Lau** reference (as it was originally applied against claim 3) to show a coil extending axially.

Applicant submits that it would not be obvious to one having ordinary skill in the art to combine these different teachings into a single device. In particular, the Examiner has not adequately stated any motivation for making such a combination. The Examiner suggests that it would be obvious to fix the speed sensor to the surface of the magnet in the air gap as taught by **Wizenez et al.** However, **Wizenez et al.** does not show a speed sensor, but rather a torque sensor. Furthermore, **Wizenez et al.** utilize a semiconductor sensor rather than a coil. The operation of such a sensor is different from that of a coil; and, accordingly, its location would not necessarily suggest the

placement of a coil in this location to one skilled in the art. Further, since the sensor of **Wizenez et al.** is a torque sensor and a much more expensive Hall device, it is not likely to suggest the movement of a coil to one skilled in the art. Accordingly, Applicant submits that there is no motivation; and, accordingly, the claims would not be obvious over this combination of references.

Furthermore, Applicant submits that even if these three references are combined, they still do not teach the present invention. The final paragraph of claim 1 recites that a speed sensor is an axially extending coil affixed to the surface of the magnet and located in the air gap. The **Mohr** reference shows a speed sensor having a coil which is not axially extending and is not fixed to the surface of the magnet and not located in the air gap. The **Wizenez et al.** reference shows a torque sensor, which is not a speed sensor, and which is not an axially extending coil. The **Lau** reference shows a speed sensor which is an axially extending coil, but which is not fixed to the surface of the magnet and not located in the air gap. Thus, there is no showing, even if the three references are combined, of placing an axially extending coil on the surface of the magnet and in the air gap in order to sense speed. For these reasons, Applicant submits that claim 1 is allowable.

Further, it is noted that the **Wizenez et al.** reference is forty-five (45) years old and the **Mohr** reference twenty-five (25) years old. If it had been obvious to combine these two

references, such a teaching should have emerged at some point in the past.

Furthermore, the present invention senses the working magnetic field of a motor rather than the stray magnetic field. The working field is more reliable to sense since it is stronger. For these reasons also, Applicant submits that claim 1 is allowable.

Claims 2, 4, 5 and 14 depend from claim 1 and as such are also considered to be allowable. These claims also contain other features related to the material and shape of the coil.

Claim 3 is the single claim in Group II. This claim adds the additional limitation that the coil extends axially for substantially the axial length of the magnet. Applicant submits that this feature is not seen in any of the references cited nor their combination. The Examiner relies on the **Lau** reference to show this feature. However, the coil in **Lau** is wrapped around a flux ring (15) in the axial direction. This flux ring surrounds the motor casing (22). The flux ring need not have the same length as the motor casing and certainly not the same length as the motor magnet. Since this feature is not seen in **Lau** or the other references, Applicant submits that claim 3 is additionally allowable.

Group III includes claim 6 which also is allowable based on its dependency. In addition, this claim states that the coil extends axially at substantially the same angle as the poles of

the armature core. Applicant submits that this feature is not shown in the **Wizenez et al.** reference or any of the other references. **Wizenez et al.** only shows that the sensor extends along the axis of the shoe, but does not discuss the possibility of an angle between the armature and the magnet. Accordingly, claim 6 is additionally allowable.

Group IV includes claim 7 which is also allowable based on its dependency. In addition, this claim describes the size of the gap between the arms of the "U" of the coil in regard to the circumferential gap between poles of the armature core. The Examiner has merely noted that **Jones et al.** shows a coil having a lateral gap between the arms of the "U". The Examiner has not even alleged that this gap equals the circumferential gap described in the claim. Accordingly, Applicant submits that this claim is additionally allowable.

Group V includes claim 8 which is also allowable based on its dependency and further describes the second single turn coil. The Examiner relies on the **Jones et al.** reference to show a second single turn coil and refers to Figure 3a. However, the transducers utilized in the **Jones et al.** reference are magneto-resistive materials connected between a voltage source. The magnetic flux changes the resistance of the material. This differs from the present invention where the coil senses the magnetic flux directly. Accordingly, Applicant submits that it would not be obvious to combine the teachings of **Jones et al.**

since it relates to a different type of transducer from the present invention.

Group VI includes claim 9 which depends from claim 8 and, accordingly, is also allowable for the reasons stated above. In addition, claim 9 describes that the two coils are connected in series and separated circumferentially by distance equivalent to a multiple of the distance between poles of the armature core. Applicant does not see any description in the **Jones et al.** patent that mentions the distance between the poles of the armature core. In fact, the sensor utilized in this reference determines the location of the teeth on a gear wheel. Accordingly, Applicant submits that claim 9 is further allowable.

Group VII includes claim 10 which also depends from claim 8 and is allowable for the reasons stated above. This claim further describes the two coils as having a common leg and a narrow W-shaped pattern. The Examiner states that **Jones et al.** shows the first and second coils being substantially U-shaped and having a common leg. However, Applicant does not see such a common leg or a W-shaped pattern. Accordingly, Applicant submits that this claim is additionally allowable.

Group VIII, the final group, includes claims 11 to 13. Claim 11 states that the coil terminals are located on an axial end surface of the magnet. The Examiner relies on **Wizenez et al.** to show this. However, Applicant does not see such terminals. Terminals (4, 5, 6 and 7) are found on the face of pole shoe (2). Wires connect these contacts to points (14-17) which are away

from the motor structure. Accordingly, Applicant submits that claim 11 is additionally allowable.

Claims 12 and 13 depend from claim 11 and are allowable for the same reasons.

The Examiner has additionally cited the **Tajima et al.** reference to show an end cap with resilient fingers extending therefrom. However, this reference does not aid the other three references in teaching the limitations not shown and discussed above in regard to claims 1 and 11. Accordingly, Applicant submits that claims 12 and 13 are likewise allowable.

IX. CONCLUSION

In summary, the various rejections of the Examiner are in error. It is believed that Appellant has countered all the reasons given for the rejections of the appealed claims, and thus these rejections do not appear to be proper. Accordingly, it is respectfully requested that the Board reverse the rejections of claims 1 to 14.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional

fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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1928-121P

Attachment: Appendix - The Claims On Appeal

APPENDIX A

THE CLAIMS ON APPEAL

1. A permanent magnet direct current motor comprising:

a permanent magnet stator including at least one permanent magnet;

a rotor including a rotor shaft, an armature core mounted on the shaft and having a plurality of poles, an armature winding wound about the poles, and a commutator mounted on the shaft adjacent one end of the armature core and connected to lead wires of the armature winding, the rotor being journaled in bearings and located confronting the stator; and

a speed sensor,

wherein the speed sensor is an axially extending coil of conductive material fixed to the surface of the magnet and located in the air gap between the magnet and the armature core.

2. The motor of Claim 1, wherein the conductive material is a thin deposit of conductive ink, especially a conductive epoxy.

3. The motor of Claim 1, wherein the coil extends axially for substantially the axial length of the magnet.

4. The motor of Claim 1, wherein the coil is a single turn coil.

5. The motor of Claim 4, wherein the coil is a single turn coil in the form of a long narrow "U" extending substantially in the axial direction of the motor.

6. The motor of Claim 5, wherein the coil extends axially at substantially the same angle as the poles of the armature core.

7. The motor of Claim 5, wherein the coil has a lateral gap between the arms of the "U" substantially equal to the circumferential gap between the poles of the armature core.

8. The motor of Claim 1, wherein the speed sensor further comprises a second single turn coil connected across the terminals of the first coil and located adjacent thereto but circumferentially spaced therefrom.

9. The motor of claim 8 wherein the two coils are connected in series and are separated circumferentially by a distance equivalent to a whole number multiple of the distance between the poles of the armature core.

10. The motor of claim 8, wherein the first and second coils are substantially U-shaped and have a common leg forming a long narrow W-shaped pattern.

11. The motor of Claim 1, wherein coil terminals of the speed sensor are located on an axial end surface of the magnet.

12. The motor of Claim 11, wherein the motor has a deep drawn cup like housing with an open end closed by an end cap and the coil terminals electrically engage with spring biased terminals fixed to the end cap

13. The motor of Claim 12, wherein the spring biased terminals are resiliently deformable fingers extending from the motor end cap.

14. The motor of Claim 2, wherein the conductive ink is a silver epoxy.